

MARINE REVIEW.

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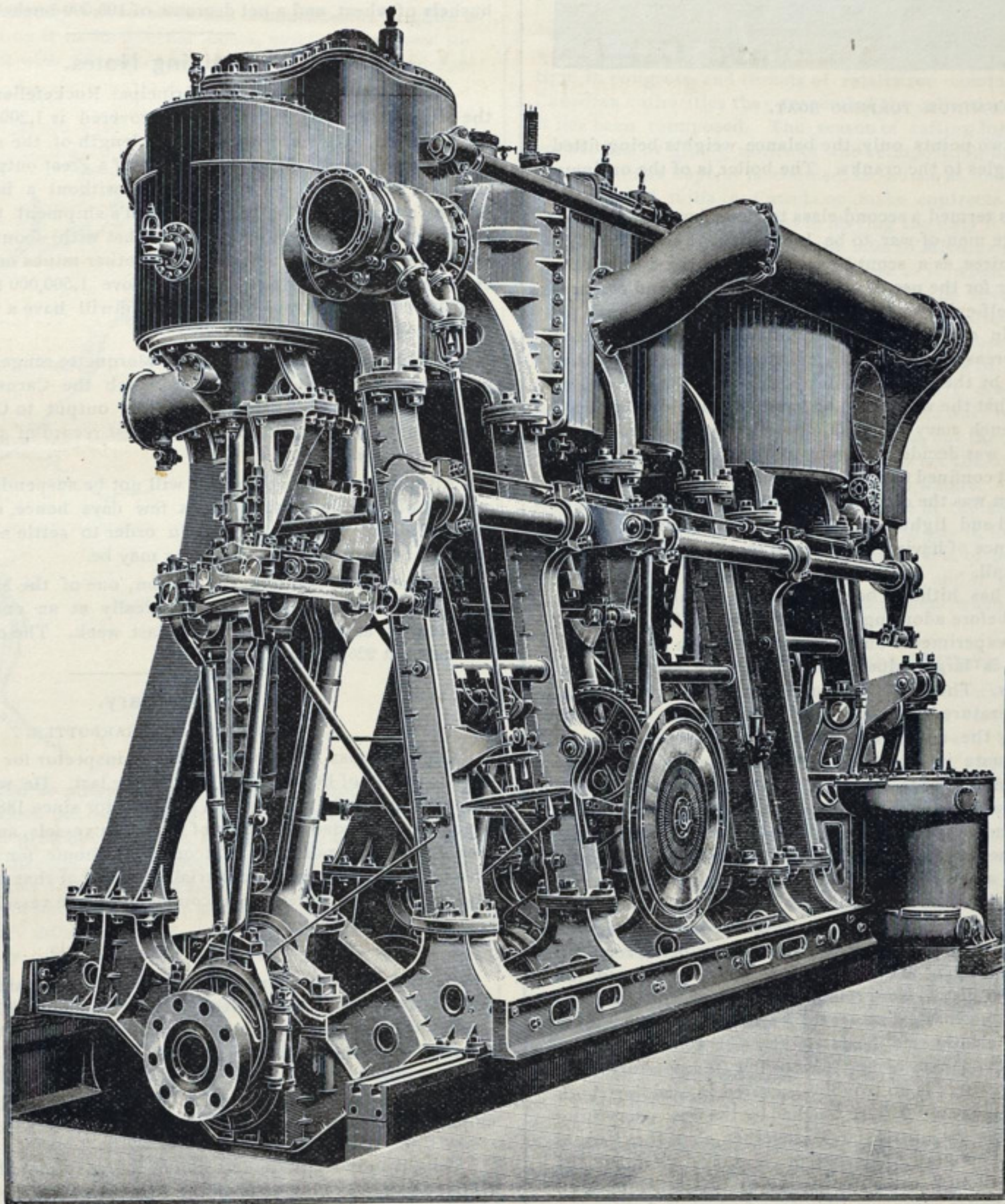
No. 16.

Engines of one of the Latest British Cruisers.

Engines of a first-class protected twin-screw cruiser, the St. George, one of the latest additions to the British navy, are illustrated on this page. The engraving is reproduced from *Engineering*, one of the London publications noted for excellent work of this kind. This ship cost, exclusive of armament, about \$1,700,000, of which about \$483,000 is represented in cost of machinery. The St. George was built and engined by Earle's Shipbuilding and Engineering Company at Hull, and is 360 feet long, 60 feet 8 inches beam and 23 feet 9 inches draught, with 7,700 tons displacement.

vibration. The cylinders are 40 inches, 59 inches, and 88 inches in diameter by 4 feet 3 inches stroke, and, in accordance with recent practice in Her Majesty's service, are separate castings standing on independent supports and connected by copper steam and exhaust pipes and steel stay rods. The surface condensers are cylindrical, of cast brass, placed in the wings. The air pumps are bolted to the engine framing and foundation, and are worked by levers from the low-pressure piston crossheads. The valves were set for a moderately early cut-off so as to indicate 10,000 horse power and yet be economical in coal consumption at cruising speeds.

The four boilers are double ended, 16 feet mean diameter, and 18 feet



ENGINES OF THE BRITISH CRUISER ST. GEORGE.

The machinery of the ship consists of two sets of triple compound engines placed abreast of one another in separate engine rooms, divided by a water tight centre line bulkhead. Steel has been used extensively in the construction of these engines, the main framing and front columns, cylinder and valve chest covers, and piston rod crossheads being cast, and the piston and connecting rods, working barrels of the high pressure cylinders, shafting, bracing rods, valve motion, etc., of wrought steel. The cast steel front columns are I-section, and these, as well as the back columns, are well braced, both athwartship and fore-and-aft, to reduce

long, each having eight Purves' patent furnaces, 3 feet 6 inches in internal diameter. The total grate area in these is 800 square feet, and the total heating surface 23,620 square feet. The working pressure is 155 pounds per square inch. In addition to the four main boilers there is an auxiliary boiler 12 feet 3 inches in diameter and 9 feet 8 inches long.

Following are a few items from a report of an eight-hours' steam trial: Steam, 153.8; vacuum, 27.7; revolutions, 100; collective indicated horse power, 10,536; mean air pressure, .09 inch; speed, 20.23 knots; coal consumption per indicated horse power per hour, 1.62 pounds.

WILLIAM L. BROWN, PRESIDENT.
WALTER F. COBB, VICE-PRESIDENT AND TREASURER.

W. I. BABCOCK, MANAGER.
O. R. SINCLAIR, SEC'Y AND ASS'T TREAS.

CHICAGO SHIP BUILDING COMPANY,

STEEL STEAM-SHIP BUILDERS.

LONG DISTANCE TELEPHONES:

SHIP YARD OFFICE.
SOUTH CHICAGO 40.

CHICAGO OFFICE.
1013 ROOKERY.
"MAIN 3447."

101ST STREET AND CALUMET RIVER.

CHICAGO, ILL., STA. S. October 18th, 1894.

SPECIAL NOTICE.

We take pleasure in announcing the completion, at our yard on the Calumet river, in South Chicago, of a

DRY DOCK,

which is the largest on the lakes and fitted with all modern appliances for the rapid and economical execution of repairs to all classes of vessels.

The dimensions are as follows:

Length	425 Feet, 0 Inches.
Width at top	100 " 0 "
Width on floor	80 " 0 "
Width of entrance on top	70 " 0 "
Width of entrance on sill	50 " 0 "
Depth over sill	17 " 0 "
Depth over keel blocks	17 " 0 "
Depth of Dock Total	23 " 6 "
Height of keel blocks	5 " 0 "

The Calumet river between the lake and the dock has been dredged by the United States government to a uniform depth of 18 feet. The floor of the dock contains over 2,000 piles, driven 5 feet between centres each way in hard blue clay, and is amply capable of supporting the largest ship of the lakes fully loaded to 20 feet draught. The keel and bilge blocks are spaced every 5 feet, and are of ample height to allow every facility of movement to workmen under the bottom of a ship. A rudder well 10 feet deep is situated near the dock entrance. The caisson, or floating gate, is built of steel and is 75 feet long and 15 feet beam, with nine 30-inch valves for flooding the dock. The dock is completely surrounded by a puddled wall of blue clay for stopping leaks.

The pumping machinery, built by the Southwark Foundry and Machine Company of Philadelphia, consisting of two submerged 30-inch centrifugal pumps, driven by vertical engines 18 by 18 inches, and, with a combined capacity of 50,000 gallons per minute, will empty the clear dock in two hours. A battery of four horizontal boilers, 60 inches by 16 feet, burning oil for fuel, drives the pumping engines and also furnishes power for the saw and jig mills.

Four steam capstans, one at each corner of the dock, afford every facility for handling and placing the largest ship. The dock is lighted by two arc lights at the entrance and fifty incandescent lamps spaced around the sides. Three steam derricks are supplied for hoisting and one side of the dock is also commanded by the 10-ton Brown traveling cantilever derrick belonging to the ship building plant.

We beg to call special attention to the unequaled facilities afforded for the repair of metal ships, the dock being situated entirely within our building yard and within 50 feet of our shops. A large stock of plates and shapes for repair work is kept on hand at all times. For the repair of wooden vessels, our facilities are equally complete, a jig mill and saw mill of large size, driven by an independent engine, having been added and placed immediately adjacent to the dock, and a sufficient quantity of oak and pine plank and timber will be always in stock. We have also remodeled entirely our machine shop, increased it largely in size and added heavy tools enough to do all kinds of machinery repairs with economy and despatch. A set of three-legged steel sheer legs, operated by steam, 110 feet high and of 100 tons capacity, are located on our river front close to the dock.

The dock has been built from the designs and under the supervision of Mr. A. V. Powell, C. E. of Chicago, and will be opened for service on Nov. 1, 1894. We have associated with us Mr. James Mowatt, for many years manager of the now abandoned South Side dry docks of Chicago.

Soliciting the patronage of the marine interests of the great lakes, which will have our best attention and despatch, we shall make every effort, by fair dealing and strict attention to business to secure its continuance.

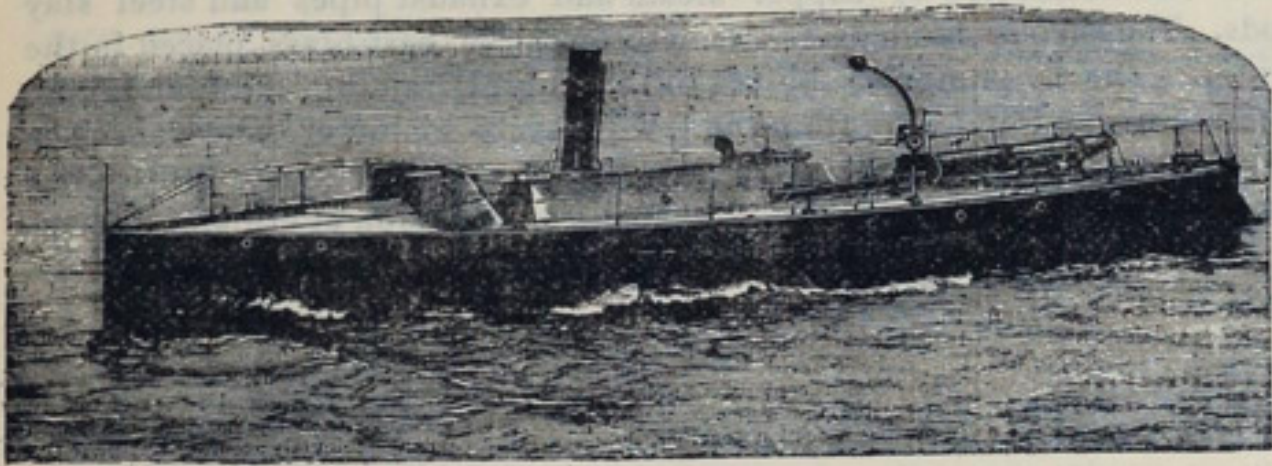
CHICAGO SHIP BUILDING CO.

By

W. I. Babcock
Manager.

An Aluminum Boat from Scientific Builders.

A boat weighing only 10 tons with steam up and coal in the bunkers, but capable of developing 20½ knots speed under 300 horse power, is a remarkable example of progress in naval architecture. Such a boat is the second-class aluminum torpedo vessel, just completed by Messrs. Yarrow & Co., the famous British builders of torpedo vessels, for the French government. The boat is of the dimensions now usual with second class torpedo vessels, being 60 feet long and 9 feet 3 inches wide, and is the largest aluminum boat of any kind afloat. Her machinery consists of a set of triple expansion engines, driving an aluminum bronze propeller at 580 to 600 revolutions per minute. These engines are balanced



ALUMINUM TORPEDO BOAT.

without bob weights at two points only, the balance weights being fitted at properly calculated angles to the cranks. The boiler is of the ordinary Yarrow water-tube type.

The object of what is termed a second-class torpedo boat is to be carried on the deck of large men-of-war, to be lowered in the water and to act, when necessity requires, as a scout to watch the movements of the enemy's torpedo boats, or for the use of the ship for landing and embarking the officers. It is self-evident that lightness of construction is of paramount importance in craft of this kind, not only because reduced displacement secures increased speed, but, considering that the boat has to be lifted and lowered by the tackle available on board the ironclad or other vessel, it is clear that the weight to be handled should be reduced to a minimum. The French navy up till last year had not adopted boats of this kind, but when it was decided to build some of them the right to submit proposals was not confined to French builders. The proposal submitted by the British firm was the one accepted, as they were prepared to guarantee a higher speed and lighter weight to be lifted than any other firm, mainly in consequence of having determined to adopt aluminum for the construction of the hull.

Comparatively little has hitherto been known about aluminum as a structural material, and before adopting it Messrs. Yarrow & Co. carried out a series of elaborate experiments on the metal to obtain information. The success of this firm is largely due to their elaborate system of experiments in all ventures. The trials of aluminum referred to its stiffness, best working temperature, corrosion, etc. It was found, in the first place, necessary to alloy the metal, by which its tensile strength was raised from 9 tons per square inch to about 18 tons. The alloy is mainly 6 per cent. of copper. As regards stiffness, etc., a general result was arrived at. All scantlings were increased 25 per cent. over that allowed for steel, and as aluminum weighs about one-third of steel, it follows that a reduction of about one-half was effected in the weight of the hull, which was reduced from about four tons for steel to about two tons for aluminum. In order to arrive at some precise information concerning corrosion, two aluminum plates were accurately weighed, and then secured on the sides of a wooden coppered sailing ship, the copper being removed and replaced by the aluminum. This ship made a voyage around the world, then the aluminum plates were removed, weighed, and found to have suffered no appreciable loss. The great foes to aluminum are alkalis, which attack it powerfully, and heat. It fuses at a moderate heat, and loses much of its strength at comparatively low temperatures. In the case of a torpedo boat there is no trouble incurred in avoiding both sources of risk. No plates or angles were touched by the fire; everything was bent cold. The frames are a little closer together than they would be if of steel. The stem and stern frames are of galvanized steel, and the chimney is also of steel, though the outer casing to it is of aluminum. The deck plates over the boiler space are likewise of steel, it being considered unwise to subject aluminum to the danger from distortion that might arise through heat.

The extra cost of material in the use of this particular boat was \$5,000 as compared with that of steel. In return there is a saving of about two tons in weight and a gain of about 3½ knots in speed over vessels of the same class and dimensions in the British navy which steam under the like conditions at 17 knots. The extra cost is, of course, the crucial point, and to judge from experience with this little boat, there does not seem much probability that the new metal will be largely used for ship building purposes for many years to come. In vessels like the torpedo

boat chasers, of which a large number are now being built in England, the cost of aluminum would be considerably over twice as much as steel. During a trial of this boat of two hours' duration the engines made 70,948 revolutions, being at the rate of 591.2 revolutions per minute, corresponding to a mean speed during the entire run of 20.558 knots per hour. The description and engraving is from the Engineer of London.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store at the principal points of accumulation on the lakes on Oct. 13, 1894:

	Wheat, bu.	Corn, bu.
Chicago.....	25,349,000	1,674,000
Duluth.....	3,315,000
Milwaukee.....	708,000
Detroit.....	1,603,000	16,000
Toledo.....	3,436,000	24,000
Buffalo.....	2,283,000	270,000
Total.....	36,694,000	1,984,000

At the points named there is a net increase for the week of 280,000 bushels of wheat, and a net decrease of 103,000 bushels of corn.

Mining Notes.

At the Mountain Iron, the principal Rockefeller syndicate mine on the Mesabi, the body of ore now uncovered is 1,200 feet long and 500 to 600 feet wide. A deep cut the entire length of the stripping is open for steam shovel work. It is claimed that if a great output was desired 9,000 to 10,000 tons could be loaded daily without a heavy expenditure for further stripping. The Mountain Iron's shipment this season are now about certain to aggregate 600,000, so that with about 500,000 tons from the Oliver and smaller amounts from other mines on the new range, the entire output of the Mesabi will be above 1,500,000 tons. The Franklin had shipped 190,000 tons on Oct. 15, and will have a total output of about 220,000 tons.

Probably of all the mines of the Marquette range, the Pewabic, which produces a high grade ore, and in which the Carnegie company is part owner, will make the best showing. Its output to Oct. 1 this year was 265,000 tons. For previous years the best record of this mine was 265,745 tons, shipped in 1893.

Although mining operations will not be suspended at the Chapin on account of the sale to take place a few days hence, all shipments will be stopped at the time of the sale, in order to settle accounts between old and new owners, whoever the latter may be.

Shipments of ore from the Canton, one of the Minnesota company's properties on the Mesabi, are practically at an end. Stock piling was commenced at one of the shafts last week. The output of the mine is estimated at 225,000 tons.

Obituary.

CAPT. THOMAS HARBOTTLE.

Capt. Thomas Harbottle, steamboat inspector for the port of Toronto, died suddenly of heart failure on Friday last. He was seventy years of age and had held the position of inspector since 1883. Previous to that time he commanded a number of Canadian vessels, among them the Princess Royal, Passport and Chicora. His home for about fifteen years was in Hamilton and the burial occurred at that place. Of seven sons who survive him, three are in command of lake vessels, and two are pursers on large passenger boats.

CAPT. F. G. BOOTHMAN.

Capt. F. G. Boothman, who was known in all parts of the lakes as the master of several Canadian vessels, and who was later in the American steamers Progress, Rust and Alcona, died at his home in Cleveland, Sunday. His illness was short. The remains were taken to Hamilton, Ont., for burial. Capt. Boothman was only thirty-six years of age but he was a very capable master and his services were highly regarded by his employers. He had been in the Alcona for three seasons past.

A light to indicate the location of the government wharf at Sault Ste. Marie, on the Canadian side of the River St. Mary, between Lakes Huron and Superior, was put in operation on August 10. The light is fixed red, shown from a square tubular lantern hoisted on a pole. It is elevated 14 feet above the level of the river and should be visible two miles from all points of approach. The mast stands on the wharf 25 feet from its south east corner.

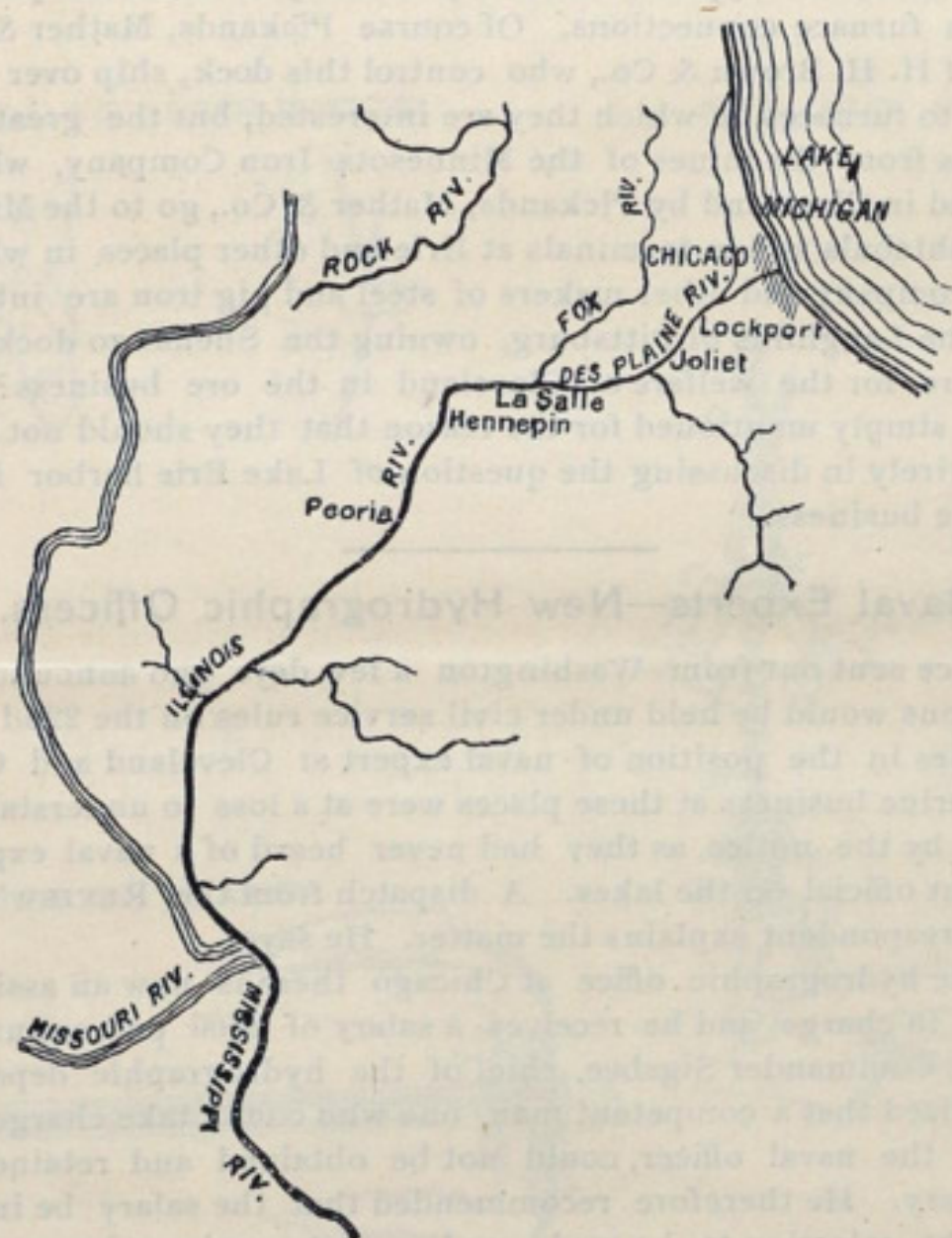
The color of the tower at Milwaukee pierhead light station has been changed from white to gray, and that of the fog signal houses from white to brown.

Capt. Philip M. Price of the corps of engineers, U. S. A., whose death was announced recently, was engaged on the survey of the great lakes.

Chicago's Drainage Canal.

Among lake vessel owners, very little attention has been given to the Chicago ship canal and drainage channel, aside from the interest taken in the big excavation contracts, upon which work has been under way for some time past. From a commercial standpoint, this waterway will not be of importance unless it is followed in future years by more extensive improvements in the direction of the Mississippi river, but now that the question of the effect of the canal on lake levels is again under discussion, a short description of the canal district and the circumstances that have led to its construction will tend to make clear some communications that have appeared in the REVIEW.

The construction of a canal from Chicago through the valley of Desplaines river to the Illinois river and the improvement of that river would open up a waterway of great commercial value from Lake Michigan to the Mississippi. This fact has been recognized for a great number of years. The history of the small canal, constructed for a distance of 100 miles through the Desplaines valley, and completed in 1848 by the state of Illinois at a cost of about \$1,500,000, is well known. In 1871 this canal was improved sufficiently to create a flow of water by gravitation from Lake Michigan and to carry the sewage from the city. For a few years this improved waterway was of some use commercially, as quite a business was conducted on it in small canal boats, and it served well for drainage purposes. But with Chicago's increase in population, and not-



withstanding means taken to pump water from Lake Michigan into the canal, the sewage sent down the canal became so great that its water was excessively foul. Under present conditions, as the sewage flows down the existing canal it passes through Joliet, a city of about 25,000 inhabitants, and other towns of smaller size. The offensive condition of the water arising from the sewage of one and one-half millions of inhabitants can be traced as far as Peoria, 120 miles from Chicago.

This was the primary cause that finally led the state legislature of Illinois in 1889 to decree that the construction of a combined drainage and navigation channel between Chicago and Joliet should be undertaken. At the latter point it was assumed that the river would be able to receive and dilute the combined sewage and lake water until plans were completed for the continuance of the navigable channel. This was the origin of the waterway which is now being constructed, and which will be as large as a modern ship-canal, and will provide a waterway, as far as it goes, for the largest lake and river steamers. The quantity of water that will pass through the channel is put at 600,000 cubic feet a minute, moving at a velocity of three miles an hour.

The course of the new channel runs nearly southwest, and at about nine miles from Chicago enters the Desplaines valley, following the course of this valley for the remainder of its length of about forty miles, till, at a short distance below Joliet, it joins the Desplaines river. Before commencing the excavation of the canal it was found necessary, in order to control the fluctuations of the river, to construct a diversion of thirteen miles of new channel, and to erect thirteen miles of banks to separate the river water from that of the canal. It was also necessary to construct a concrete dam or spillway 367 feet long and 16 feet above the water level at Lake Michigan, to allow surplus water to flow towards Chicago. The width of the bottom through the part where the clay exists is 202

feet, and of the other parts 110 feet. About twenty miles of the canal is through rock or hard material, and this part will be 160 feet wide at the bottom, with vertical sides, the depth of the bottom from the surface of the earth being from 30 feet to 35 feet. The depth of water throughout will be 22 feet. The quantity of glacial drift to be moved will amount to 25,500,000 cubic yards, and of solid rock nearly 11,000,000 yards. The works were commenced in 1892, and are expected to be completed in 1896, and the cost is estimated at \$5,250,000, while a further sum of about \$1,000,000 will be required to improve the navigation of the Illinois river below the junction of the new canal. If this is ever done there will be an unobstructed navigation throughout the 227 miles of the lower part of the river, sufficient for the largest class of Mississippi steamboats, to Utica. Above this a fall of 140 feet will have to be provided for by locks.

More Trouble About Log Rafting Duties.

Lumbermen of the Saginaw district are again stirred up by reports from Canada that the duty on boom sticks is to be reimposed. This is a duty of 27 per cent. imposed on boom sticks which surround log rafts and which are towed across Lake Huron back and forth. With the duty in force, a revenue of 27 per cent. would be collected on the boom sticks every time a tug goes into a Georgian bay port after a raft. This duty was put on last spring, but the Wilson tariff bill was pending at that time in congress, and threats of retaliation coming to the notice of the Canadian authorities they suspended the collection. Now it is said that it has been reimposed. The season of rafting logs across the lake has ended, but by giving notice of the reimposition of the boom stick duty the Canadians hope, it is claimed, to induce as many lumbermen as possible to build mills in Canada or make contracts for sawing there. Of course, if they should persist in levying the duty it will seriously interfere with the rafting of logs across the lake to Michigan mills. But if there is any disposition manifested to adhere to it when congress meets some measures of retaliation will undoubtedly be invoked. Ben Boutel of the Saginaw Bay Towing Association, which rafted over 150,000,000 feet of logs from Canada during the season just closed, says of the matter: "Its effect would be to put a stop to the towing of logs from Canada, and that would mean the closing down of nearly every saw mill along the Saginaw river. If such a duty was collected only once during the season it would not materially affect the business, but the intention of the Canadian government, as I understand it, is to tax the towing companies every time they place a boom stick in Canadian waters. This would involve an enormous expenditure during the course of the season, and it would be impossible for the owners of the logs to pay it, for towing rates would increase accordingly. We have thirteen sets of boom sticks at Spanish river now, although the season has ended, and if this rule is carried out we will be compelled to pay duty on them when we bring them across to this side."

Lake Freight Matters.

If present conditions in the lake freight market continue only a few days longer, it would seem that owners of a very large part of the lake fleet, especially the poorer grade of vessels, will be fully warranted in laying up their boats and accepting a saving of 20 per cent. on the season's insurance. Of course, this is not saying that vessel owners will pursue such a course, as they are often at a loss themselves to give cause for running their boats when they know that they would be better served in tying them to the docks. Within the past few days the demand for grain carriers has been almost entirely shut off, from both Chicago and Duluth. Shippers at the head of the lakes had taken a large number of vessels for the latter half of the present month, and the engagement of this tonnage has resulted in iron ore rates from Lake Superior being maintained, but there has been practically nothing in the way of down-bound cargoes from Lake Michigan, and the supply of soft coal going to either of the upper lakes has been so very much short of the tonnage offered that indications of an early closing of the season's business are everywhere evident.

On two or three cargoes of ore from Ashland 90 cents, or an advance of 5 cents, was paid, but this was due partly to delay in loading at the Ashland docks, which are not suited to modern vessels, and to other causes. Rates on hard coal from Buffalo to Chicago and Milwaukee have advanced to 70 and 65 cents respectively, and if there is considerable hard coal to move the last few trips of the season may result in a little profit to vessels, but this is doubtful.

"The cabins of a war vessel are a curiosity," says a writer in Industry of San Francisco. "The captain and admiral cannot dine together, because there is a different rank. They must have different dining rooms, pantrys, and a separate establishment. The line and staff must have different quarters and messes quite distinct. Then again the warrant officers, the gunner and carpenter, must have separate cabins and outfit to keep the rank distinct. These last are expert officers that hold commission by 'warrant.' It is a little empire, having all the attributes of a monarchy with its grades and rank, perhaps necessary, perhaps not."

A Great Excavator.

The Chicago drainage canal is occasioning great improvements in the methods of excavating rock and earth on a large scale. The steam shovel was considered a great economizer of labor when it was first perfected, but the machinery now in use far surpasses the achievements of the steam shovel when merely used for transferring earth and rock to cars alongside. The Brown hoisting and conveying machines have been brought into requisition for discharging excavated matter on huge dumps along the banks of the canal, thus making the work of the steam shovel much more efficient. The most remarkable machine, however, in point of size and capacity for work, is the Hoover & Mason excavator and carrier. It was designed by A. J. Mason and Frank H. Hoover of Kansas City, and is working on the Gahan & Byrne contract. This machine is 640 feet in length, is constructed of steel truss work throughout, and resembles a cradle in shape. The body is 320 feet in length, from each end of which extends a cantilever projection, one being 178 feet in length, with its tip 90 feet from the ground, and the other being 142 feet long, with its tip also 90 feet from the ground. The body of the machine extends across the bed of the canal and on each bank rests on huge steel flat cars of the Krupp gun car pattern, which move on a broad gauge track. Four plows are operated in the canal bed by a large chain moved by a 50 horse-power engine. Two scrapers connected with the plows throw the earth on an endless conveyor, consisting of a series of steel pans. The conveyor passes out to the end of either arm and empties the earth either into cars or on a dump as desired. An engine of 175 horse-power operates the conveyor. It is stated that this machine reduces the cost of earth excavation as low as six cents per cubic yard, while contracts have been let on the canal at rates varying from 17 to 30 cents.—Iron Age.

Canadian Lake Charts and Surveys.

Chief-Engineer William P. Anderson of the department of marine and fisheries, Canada, sends us a list of ten new sheet charts of the Georgian bay and north channel, embodying the result of the recent survey by Staff Commander J. G. Boulton, R. N., and by Mr. W. G. Stewart, R. M. C. Following are the official catalogue numbers of the charts and the distances embraced by them: 906, entrance to Georgian bay, etc.; 907, Georgian bay to Clapperton island; 908, Clapperton island to Mildram bay; 909, Mildram bay to St. Joseph island; 970, Clapperton channel; 1,507, St. Joseph's channel; 1,213, Collins inlet to McCoy islands, north-east coast of Georgian bay; 1,214, Cabot Head to Cape Rich; 1,408, Collingwood approaches; 1,731, Parry sound and approaches.

One sheet in addition to those just noted is soon expected from the engraver, and it will take in Matchedash bay and surroundings to Moose point and Christian island. There will then remain one sheet embracing this year's survey work to complete the bay. The charts are all published by the British admiralty, and it is understood that the admiralty will issue, when the survey is complete, a double elephant sheet of the whole bay and north channel. Mr. Stewart in charge of the survey, has been instructed to continue with the survey of Lake Huron and will next year work up the south shore of Manitoulin island toward Detour channel.

Any of the charts here referred to as published may be had from the MARINE REVIEW at a slight charge above that made by the British admiralty.

Notices to Mariners.

Another of the Sault river lights sought by the vessel owners has been secured. The light-house board announces that two fixed red lens-lantern lights will be established immediately at Pilot island, south side of Mud lake, to mark a range line intersecting with the Winter point range line at Mud lake turning buoy (first-class can, black and white perpendicular stripes) and guiding between the buoy and a point about five-eighths of a mile to the southward and westward of the Encampment crib light. Keeping the rear light open a little to the westward of the front light will carry in the best water on a course about S. by W. $\frac{1}{4}$ W. The front light will be shown at a height of 26 feet above the mean level of the lake from a white post on the center of Pilot island. The rear light will be shown at a height of 42 feet above the mean level of the lake from a white triangular pyramidal skeleton iron tower on a cluster of piles about 1,500 feet S. by W. $\frac{3}{4}$ W., in rear of the front light. The upper part of the tower is covered with a day mark of white horizontal slats.

Long's Car Dumping Machine.

The Patent Office Gazette, issue of Oct. 9, contains reference to patents issued to Timothy Long, of Cleveland on apparatus for dumping railway cars. Mr. Long patented a coal bucket that is now in use in several places on the lakes, and he has been for some time engaged on the details of the car dumping apparatus, on which he has also been granted patents. Specifications giving full details of the apparatus may be had from United States commissioner of patents, Washington, D. C., at 10 cents each. There are three sets of specifications, and they are numbered 527, 117, 527, 118 and 527, 119.

A Few Facts About Loss of Ore Trade in Cleveland.

Citizens of Cleveland are making a strong effort to prevent any further loss in iron ore business going to other ports of less importance on Lake Erie. They have not, however, considered all the conditions. All endeavors to improve harbor facilities at any of the lake ports are deserving of support from vessel owners, and the effort the city officials and the Cleveland Chamber of Commerce in furtherance of improvements within the present harbor are especially commendable, but it is strange that in all the discussion brought out on this subject there has been no reference to conditions regarding the control of docks at Lake Erie ports that have a direct bearing on the present state of affairs. The furnace owner of Pittsburg and the Mahoning valley, who is the purchaser of the ore, directs and controls its storage and shipment after it is brought down by vessel, and many people who have been discussing this subject seem to forget that of late years furnace owners have been cutting quite a figure in the Lake Erie dock business. Aside from the Cleveland Rolling Mill Company there are practically no furnace interests connected with Cleveland docks. The Cleveland & Pittsburg dock, for instance, is controlled by Morris, Ellsworth & Co., who are not only removed from furnace interests but they have, in fact, not even an indirect interest in the mining or shipment of ore. Their dock is what is termed a "wild" dock, dependent largely upon a business from furnace owners who are not big factors in the iron or steel trade. Then there is the other large Cleveland dock, the Nypano, which is practically in the same position as regards its furnace connections. Of course Pickands, Mather & Co. and the firm of H. H. Brown & Co., who control this dock, ship over it some ore going to furnaces in which they are interested, but the great volume of business from the mines of the Minnesota Iron Company, which are represented in Cleveland by Pickands, Mather & Co., go to the Minnesota dock at Ashtabula and to terminals at Erie and other places in which the Carnegie company and other makers of steel and pig iron are interested. What do the Laughlins of Pittsburg, owning the Shenango dock at Ashtabula, care for the welfare of Cleveland in the ore business? These points are simply mentioned for the reason that they should not be overlooked entirely in discussing the question of Lake Erie harbor facilities and the ore business.

Naval Experts—New Hydrographic Officers.

A notice sent out from Washington a few days ago announced that examinations would be held under civil service rules on the 22nd inst. to fill vacancies in the position of naval expert at Cleveland and Chicago. Men in marine business at these places were at a loss to understand what was meant by the notice, as they had never heard of a naval expert as a government official on the lakes. A dispatch from the REVIEW's Washington correspondent explains the matter. He says:

"In the hydrographic office at Chicago there is now an assistant to the officer in charge and he receives a salary of \$600 per annum. For some time, Commander Sigsbee, chief of the hydrographic department, has recognized that a competent man, one who could take charge in the absence of the naval officer, could not be obtained and retained at so small a salary. He therefore recommended that the salary be increased to \$1,200, the selection to be made under civil service rules, and that a similar policy be adopted in regard to other branch officers. The secretary of the navy saw the wisdom of the move and on Monday next examinations will be held at Cleveland and Chicago, of young men who are candidates for the positions of assistants in the two cities. The subjects of the examinations will be letter writing, pure mathematics, physical geography, nautical definitions and navigation. The department regrets the delay in establishing the Cleveland office, but it could not be avoided. The office will be in charge of Ensign Wm. C. Cole, who has just been ordered from San Francisco to Cleveland."

From the Air Bag Salvage Company.

The attention of the REVIEW has been directed to letters from the American Salvage Syndicate, C. F. Hobart general manager, in which it is claimed that the air bag system of raising wrecks, on which the company holds patents, was not given full credit for work done in raising the fire boat Yosemite, which sunk off Chicago harbor a short time ago in 32 feet of water. The managers of the company are now in the east, where they were called to take up a boat loaded with oil, which was sunk off Delaware bay several days ago, and this is given as a reason for their not taking up an active search for the steamer Brunswick, sunk off Dunkirk, Lake Erie, in 1881. Letters which they present regarding the Yosemite are signed by city employes on the fire boat, employes of the Independent Tug Company, whose tugs were used in raising the sunken boat, and also the superintendent of the dredge and pile driver used on the job, all of whom claim that the air bags raised the wreck. The officers of the salvage company are much put out, owing to their claim that false reports were circulated regarding the efficiency of their system of operating on sunken vessels.

Illustrated Patent Record.

SELECTED ABSTRACTS OF SPECIFICATIONS OF A MARINE NATURE—FROM LATEST PATENT OFFICE REPORTS.

527,045. Screw Propeller. Alfred W. Case, Highland Park, Conn. Filed Nov. 1, 1893. Serial No. 489,694.

Claim. A screw propeller comprising a hub with projecting blades, each of which is a counterpart of the other in shape and in its position with relation to the axis of the hub and to its plane of revolution around the same, and which has its uninterrupted working surface described by a straight generatrix and extending without break from the hub to the outer end of the blade, said working surface being set on an angle across the axis of the hub, and also inclined forwardly from the hub to the outer end of the blade, whereby each blade operates to thrust outwardly as well as rearwardly when in motion.

527,060. Means for Raising Anchors. Henry A. House and Henry A. House, Jr., Bridgeport, Conn., assignors of one-half to Robert Rintoul Symon, London, England. Filed Nov. 25, 1893. Serial No. 491,971. Patented in England Oct. 6, 1893. No. 18,760.

Claim. Means or devices for raising anchors which consist of a sleeve H free to slide on the main cable D and provided with a lip H' adapted to be engaged by the hooks of the grappling apparatus, a chain or a rope E connecting the sleeve H with the head or fluke end of the anchor, and

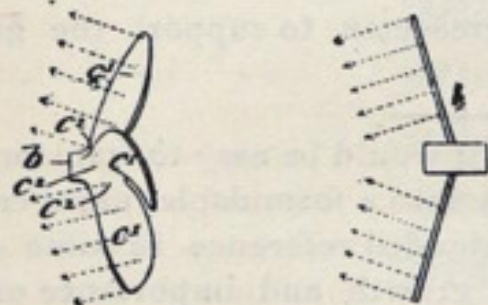
attached to the sail, extending transversely thereof from the second reef cringle to an attachment with a mast hoop, a down-haul attached to the mast hoop, connected with the stay rope, a reefing tackle connected with the down-haul and with the reef penants, whereby both are simultaneously operated, and a second diagonal stay rope extending from the second reef cringle to the upper inner portion of the sail, whereby the mast hoops will be drawn downward simultaneously with the action of reefing, and whereby also the sail may be converted into a storm trysail.

An Instrument for all Kinds of Weather.

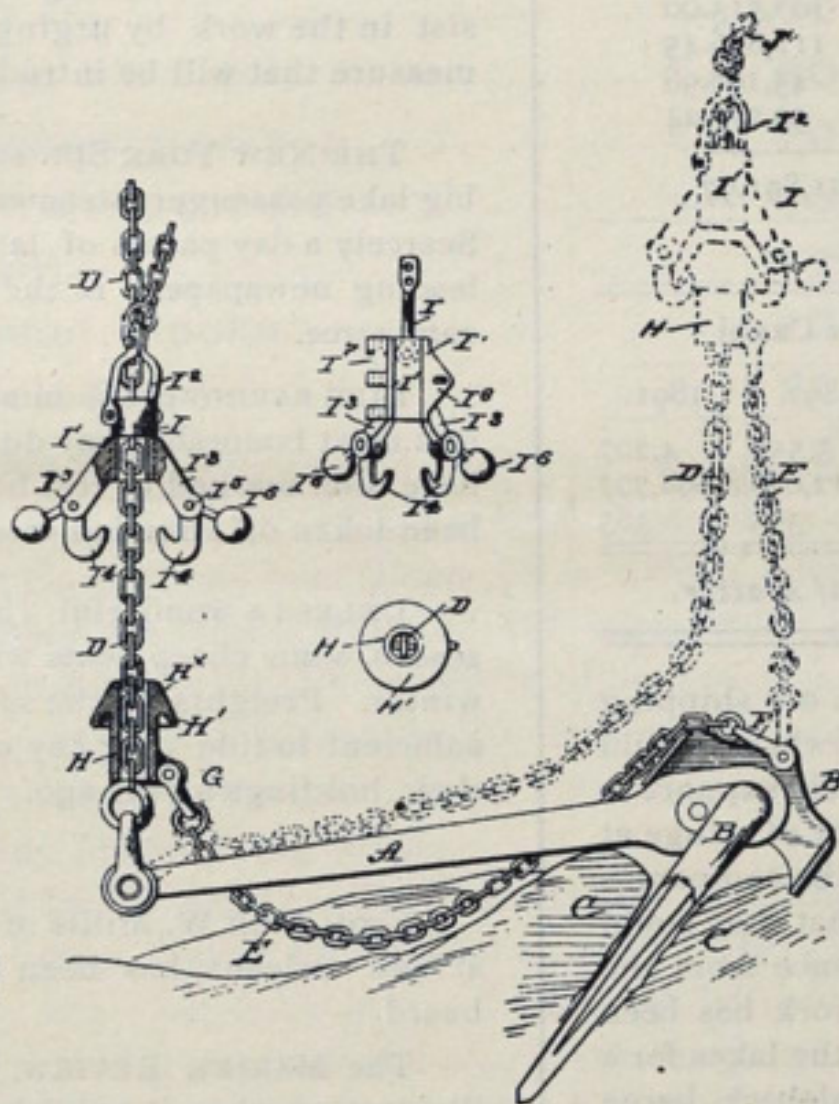
Lieutenant Beehler, U. S. N., has undoubtedly scored a success with his solarometer, an instrument by means of which a ship's latitude, longitude and compass errors may be determined with accuracy by observation of the sun and stars at all hours of the day and night. As a result of trials with the instrument on the North German Lloyd steamer Weimar, on a voyage from Baltimore to Bremerhaven and return, six of them are being constructed at Washington and some of them will be delivered to the navy department about the end of this month; one will be sent to Europe to serve as a model for the construction of duplicates in England and other countries.

On the voyage of the Weimar 169 observations were made and the degree of accuracy obtained was the same as that obtained with the sextant when

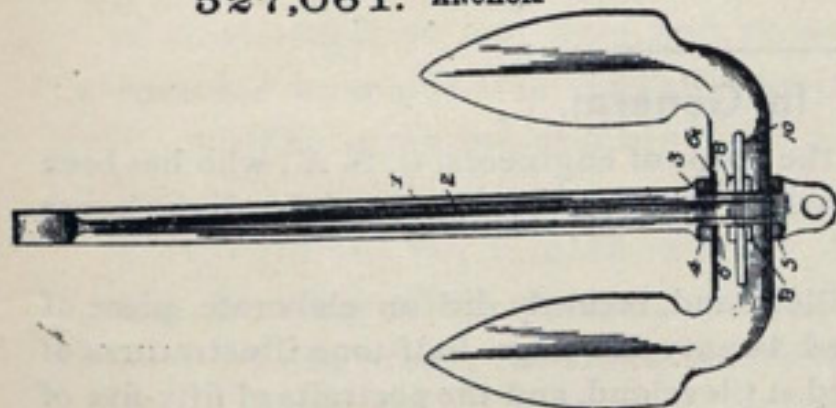
527,045. SCREW-PROPELLER.



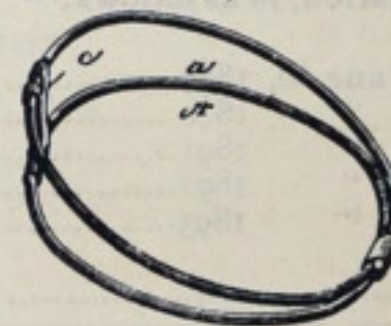
527,060. MEANS FOR RAISING ANCHORS.



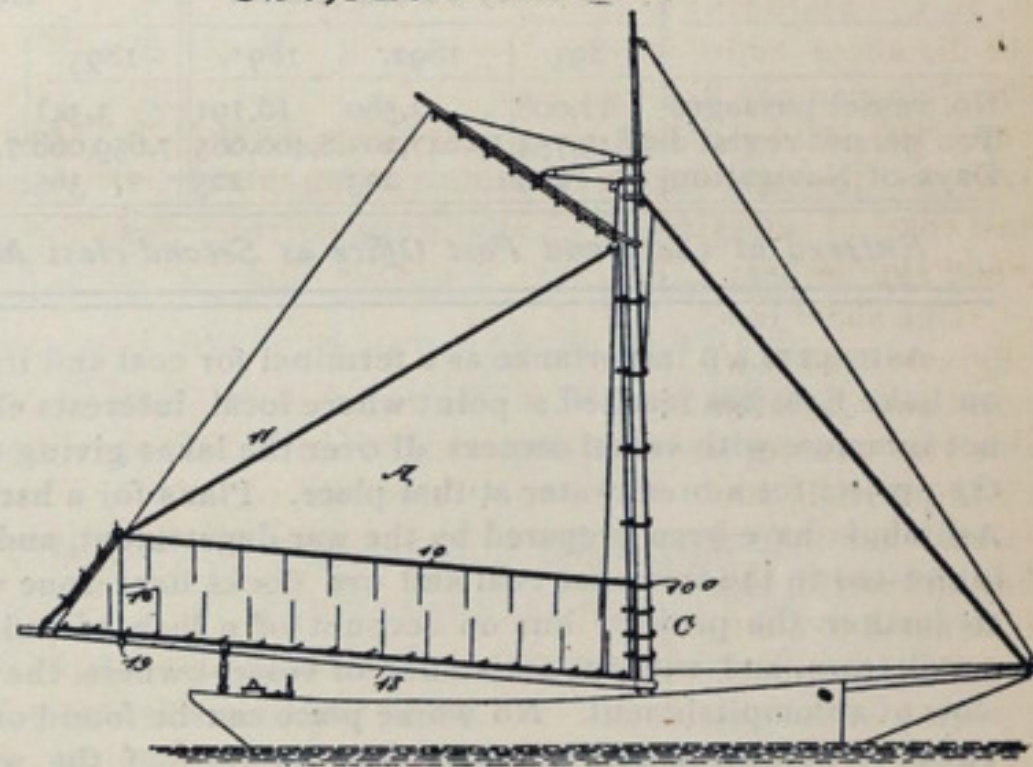
527,061. ANCHOR.



527,167. MAST-HOOP.



527,340. REEFING SAILS.



grappling apparatus I sliding on the main cable D and provided with hooks I' adapted to engage with the sleeve H so as to connect the chain J with the chain E combined and operating.

527,061. Anchor. Henry A. House and Henry A. House, Jr., East Cowes, assignors of one-half to Robert Rintoul Symon, London, England. Filed May 21, 1894. Serial No. 511,967. Patented in England Sept. 9, 1893, No. 17,010.

Claim. An anchor having the shank and flukes cast in swiveled connection with each other, the eye of the shank having shoulders with a free space between them, the stop lugs cast on the fluke arm extending through the free space to bear latterly against the eye and to abut against the shoulders and the fins cast on the arm and forming extensions of the cast lugs.

527,167. Mast Hoop. William R. Baker, Watertown, N. Y. Filed May 9, 1894. Serial No. 510,651.

Claim. A mast or sail hoop consisting of a single or continuous piece coiled or curved toward the rear into two diverging circles or coils from a single point at the front, with the ends thereof clasped or secured upon the intermediate body portion.

527,340. Reefing Sails. Samuel G. Martin, Branchport, N. J. Filed Mar. 14, 1894. Serial No. 503,600.

Claim. The combination, with a fore-and-aft sail provided with a first and second reef cringle and cringles intermediate thereof, of reef penants adapted for attachment to the boom and passed upward through the second reef cringle and downward through the other cringles, a stay rope

it was possible to use that instrument for observations of the sun. At night the sextant could not be used to observe the stars because the horizon was not visible, so that at those times there was no check on the accuracy of the determinations by the solarometer, except that indicated by the instrument itself and the run of the ship as estimated. In Chesapeake Bay and the English Channel where the lighthouses and known points on land also establish the position of the ship, the results by the solarometer agreed perfectly with the bearing of those points, so that there can be no doubt as to the accuracy of the instrument. The instrument was taken to Paris and explained to Mr. Gautier, the French instrument maker, who has a contract to make them in Paris. It was then exhibited at the ministry of marine and colonies to the French naval officers on duty there, and then at Hamburg, where it was explained to the German naval officers, professors and astronomers at the German naval observatory, all of whom expressed their approval of its principles and their admiration of its mechanical design.

The new fast twin-screw Norwich line steamer City of Lowell, latest of the Long Island sound floating palaces, a few days ago made the run from New York to New London, 125 miles, in 5 hours and 34 minutes, averaging 22.4 miles an hour, and during a short spurt she is said to have steamed at the rate of 23.45 miles an hour. Engines averaged 145 revolutions with steam at 160 pounds. The Lowell is 336 feet over all and of 2,975 gross tons. Her engines are 26, 40 and 64 inches by 36 inches stroke and were designed for 4,600 horse power each. She has six Scotch boilers each 12 feet 10 inches by 13 feet 6 inches.

MARINE REVIEW.

DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 516 Perry-Payne building, Cleveland, O.

SUBSCRIPTION—\$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

The books of the United States treasury department contain the names of 3,341 vessels, of 1,227,400.72 gross tons register in the lake trade. The lakes have more steam vessels of 1,000 to 2,500 tons than the combined ownership of this class of vessels in all other sections of the country. The number of steam vessels of 1,000 to 2,500 tons on the lakes on June 30, 1894, was 318 and their aggregate gross tonnage 525,778.57; in all other parts of the country the number of this class of vessels was, on the same date, 211 and their gross tonnage 314,016.65. The classification of the entire lake fleet on June 30, 1894, was as follows:

Class.	Number.	Gross Tonnage.
Steam vessels.....	1,731	843,239.65
Sailing vessels.....	1,139	302,985.31
Canal boats.....	386	41,961.25
Barges.....	85	39,214.51
Total.....	3,341	1,227,400.72

The gross registered tonnage of vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

	Number.	Net Tonnage.
Year ending June 30, 1889.....	225	107,080.30
" " " 1890.....	218	104,515.00
" " " 1891.....	204	111,856.45
" " " 1892.....	169	45,168.98
" " " 1893.....	175	99,271.24
Total.....	991	471,891.97

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.

	St. Mary's Falls Canal.			Suez Canal.		
	1893.	1892.	1891.	1893.	1892.	1891.
No. vessel passages	12,008	12,580	10,191	3,341	3,559	4,207
Ton'ge, net regist'd	9,849,754	10,647,203	8,400,685	7,659,068	7,712,028	8,698,777
Days of Navigation	219	223	225	365	365	365

Entered at Cleveland Post Office as Second-class Mail Matter.

ASHTABULA'S importance as a terminal for coal and iron ore shipping on Lake Erie has reached a point where local interests elsewhere should not interfere with vessel owners all over the lakes giving their support to the project for a breakwater at that place. Plans for a harbor of refuge at Ashtabula have been prepared by the war department, and the companies interested in the immense coal and ore docks have done what they could to further the project, but on account of a lack of influence from the small town, and without assistance of vessel owners, the work has been slow of accomplishment. No worse place can be found on the lakes for a vessel to weather a gale outside. The captain of the whaleback barge that went ashore there in Saturday night's storm found, after he had been left by his steamer to be picked up by a harbor tug, that the tug captain was unwilling to take the risk of towing him safely into port. He dropped his anchors, but as the gale increased his vessel was driven onto rocks, and the result was the probability of loss of life, as well as the vessel, and a certainty of heavy expense in wrecking and repairs. Ashtabula is one place as against nearly all others needing breakwaters to which the attention of vessel owners should be directed.

A GREAT volume of business has been done in the season that now lacks only another short month of the end. The new Mesabi iron range of Minnesota will add a million and a half tons of new iron ore to the output of the older districts, and the movement of freight of all kinds to and from Lake Superior will be considerably greater than ever before. But on the whole the profits on vessel property will be only a trifle greater than during last season, when depression was noted in all directions. Again it may be said that only the best class of freight carriers will give a return that is at all in proportion to the investment, while the older vessels that lack capacity and modern improvements in machinery, and cargo handling facilities, are not only out of the race as money makers, but they are also on the hands of their owners without a market for their sale.

IT IS MORE than probable that repairs on the whaleback tow barge ashore at Ashtabula will prove very costly, but the American Steel Barge Company's entire fleet has been especially fortunate since the launch of the first boat of their type. They have met with some loss from strandings and slight collisions in the rivers, but if insurance had been paid on them, it is more than probable that the premiums for a single season would more than offset all losses from the beginning. There is no denying the

fact that the whalebacks possess stability, and experience with this fleet would seem to suggest the benefits of mutual insurance for the best class of risks on the lakes.

THE QUESTION of canal improvement in New York state is to be submitted to the electors of the state at the coming state election. It would seem to the impartial observer of canal matters in the Empire state that the vote of the people will be against further expenditures on a half-way plan of improvement in the canals. The people of New York are not to be blamed for opposing the heavy burden of canal improvements and maintenance that should be borne by the general government. In allowing this matter to go to a vote of the people the canal advocates have undoubtedly made a mistake.

WHALEBACK competition during the past season may prevent the Goodrich Transportation Company of Chicago from building the new boat for which they had plans made some time ago, but it does not seem as though Capt. McDougall will carry out the claim, credited to him in Duluth, of putting a freight and passenger boat, in addition to the Christopher Columbus, into the trade between Chicago and Milwaukee next season. The Goodrich company has a very good hold on Lake Michigan business.

PRESIDENT Corrigan, Treasurer McKay, Secretary Keep and Mr. Goulder, counsel of the Lake Carriers' Association, will meet the executive officers of the light-house board in Washington, Monday, to consider plans in the next congress for new aids to navigation in different parts of the lakes. Efforts of the association during the coming winter will be directed to additional lights and fog signals, and all members should assist in the work by urging their congressmen to support the general measure that will be introduced.

THE NEW YORK SUN suggests that it would be easy to transform the big lake passenger steamer North West into a formidable naval cruiser. Scarcely a day passes of late without extended reference in some of the leading newspapers in the east to the growth and importance of lake commerce.

LIFE SAVING crews in all parts of the lakes have acquitted themselves in a most honorable way during recent blows. Their services this season have been marked by real bravery, as in half a dozen cases full crews have been taken off stranded vessels in gales of the severest kind.

UNLESS a wonderful change comes over the prospects for another season, some cheap boats will be found in lake cities during the coming winter. Freights of the season now drawing to a close have not been sufficient to tide over any of the owners who had reason to feel tired of their holdings a year ago.

In General.

Capt. John W. Millis of the corps of engineers, U. S. A., who has been at New Orleans, has been made engineer secretary of the light-house board.

THE MARINE REVIEW, Cleveland, recently did an elaborate piece of illustrating when it published twenty full page half-tone illustrations of the new lake steamer launched at Cleveland, and the portraits of fifty-five of the officers and managers of the Lake Carriers' Association.—The Trade Press.

That colossal failure, the steamer Howard Cassard, which was to have accomplished wonders in the marine world, is to be sold for debt at Baltimore by order of court. About \$130,000 was expended in the venture, and the Arrow Steamship Company is now referred to as a stock-jobbing corporation.

A recent return shows that in August, 1894, there were 5735 steamers flying the British flag, 810 flying the German flag, 503 flying the French flag, 430 flying the American flag, 359 flying the Spanish flag, 510 flying the Norwegian flag, 213 flying the Italian flag, 462 flying the Swedish flag, and 1382 flying other flags.

The war of rates on the Atlantic—first commenced by German steamers—has been disastrous for all concerned. The shares of the North German Lloyd, which once stood at 200, are now down to 99 marks, while the shares of the Hamburg Packet Company are down to about one-half of their original value. Up to the end of August of this year the former concern is said to have carried 52,500 passengers less than in the corresponding period of 1893.

Pig iron production on Oct. 1 was not so great as on Aug. 1. As compared with Oct. 1, 1893, the trade in point of production, is now in much better condition, but it will be remembered that at this time last year production was at a standstill in several districts. The weekly capacity on Oct. 1 a year ago was 77,334 tons against 158,567 tons at present. Stocks, irrespective of amounts held by the large steel companies, aggregated 515,712 tons on the first of the month, against 532,264 tons on Sept. 1, and 567,848 tons on August 1.

Method of Placing Engines and Boilers Aboard Vessels.

An attache of one of the eastern ship yards, who for some reason fails to give his name, writes at some length of a method of erecting, aligning and securing machinery and boilers aboard vessels. He says:

"While the engine is being erected in the shop, the seatings or keelsons have been riveted in place in the ship. The correct location of the seatings is obtained by stretching a line, at the proper height from the base line as measured on the drawing, from the stern post to the forward bulkhead of the engine room, and then measuring down from the line. A telescope may be used instead of a line to locate targets in each bulkhead. Usually 2 inches are allowed for errors in the height of seatings. With the line in place, the outboard side of the stern post is center-punched for the hole, and the inside bulkhead is also marked from the line. The boring bar is set to these center-punch marks and the stern post and bulkhead bored for the stern tube. The boring bar is driven by a small engine outside. The stern tube is turned, bored and fitted with linings for *lignum vitæ* in the shop. The *lignum vitæ*, after being well soaked with water, is bored to the stern tube put in place, no subsequent boring in the ship being necessary. A line is stretched through the tube to check all previous measurements and a center-punch mark made in the forward bulkhead.

"The propeller shaft is then put in place, and the propeller fastened on. The coupling inside must be secured so that launching or towing will not move the shaft in a fore and aft direction, at the same time that the propeller may turn. Before launching the seatings of the different bearings are located exactly by measuring down from the line. After launching the bearings are all put in and approximately located from the line. A length of shaft is put in next to the propeller shaft, and its position is fixed by bolting the two couplings hard and fast together, adjusting the bearings so that this can be done. The successive lengths are then put in, allowing the coupling to take care of the alignment.

"The thrust bearing is located temporarily, and the line shaft bearings are located exactly and made fast to the seatings. The thrust is then brought up against the rings and the bearings secured in place. The engine is lowered into place with temporary wedges under the bed-plates. It is then adjusted entirely from the after coupling. This is brought in line with and in contact with the forward coupling of the line shafting. A very thin wedge is used for this purpose, and it is shoved in at intervals around the circumference of the couplings until it barely enters, the entrance being the same in any position.

"The coupling bolts are set up only after all the holding-down bolts are in and the distance pieces or shims are all under the bedplate. These shims are fitted very carefully below every bolt hole, and they are then drilled with a ratchet in place. At the same time that the holes through the seatings are being drilled, a template of the bedplate is sometimes made, with all bolt holes marked, and the holes drilled through the seatings before placing the engine aboard. After setting up holding-down bolts the wedge is tried between the couplings again. It should not enter at any point. The coupling bolts then set up, after everything is fastened, the main bearing nuts are taken off and the caps removed, the crank shaft is lifted out and a line stretched to see if everything is correct. The journals are rubbed with red lead and the crank shaft replaced without the caps and turned. It is removed again and the brasses examined, to make sure that the bedplate has not been sprung by the holding-down bolts. If any change is detected the brasses are scraped again and the crank shaft well fitted. In the Charleston and several ships built by the Cramps the brasses were all lined and scraped to fit a large cast iron mandril made the same size as the crank shaft. It was made hollow for lightness. This was used for both engines, to make brasses interchangeable. In erecting, the engines were lined entirely with lines. The shaft strut was tried in place on the ship and marked from a line stretched in the axle of the shaft. It was then carried back to the shop and bored. No boring bar was used on the ship."

Around the Lakes.

Homer Durand of Toledo has sold the schooner Anna P. Grover to David Dake of Charlevoix.

Wheeler & Co. of West Bay City are conducting negotiations that may result in their securing, shortly, a contract for another steel boat.

There are now eight tugs engaged in Milwaukee harbor towing, and E. G. Crosby of Muskegon talks of entering the field with three more.

Langell & Sons of St. Clair, Mich., have about completed a wooden ferry boat for service on the river at that point. She has been named Siesta.

Mr. R. R. Rhodes of Cleveland, managing owner of the wrecked steamer Neosho, is in Milwaukee looking after the interests of the owners of the boat.

Canadian engineers who have been superintending the work of removing obstructions in the channel between Bois Blanc island and Amherstburg, Detroit river, report that the bad spot known as New York

shoal is composed of immense boulders lying on a table of rock. It will be removed next spring.

F. R. Straight bought the schooner Mineral State at marshal's sale in Toledo, Monday, for \$1,140. Her valuation in last year's insurance register was \$5,500.

The steel steamer Selwyn Eddy is another boat chartered by the Northern Steamship Company to carry flour from the head of Lake Superior to Buffalo for the balance of the season.

Another very large cargo has been carried from Lake Superior by the steel steamer I. W. Nicholas, recently built by the Cleveland Ship Building Company. Her last cargo from Duluth to Buffalo consisted of 2,880 net tons of flour.

Ninety feet of water is said to cover the sunken schooner William Home, which foundered with the loss of all but one man on Lake Michigan, a few days ago. If such is the case, it is not probable that any effort will be made to recover her cargo of pig iron.

If Carlin & Stickney of Saginaw, whose bid of 87 cents was the lowest for removing boulders at Ballard's reef, find few boulders to remove they have a good contract, but they have trusted more to chance than other companies. The bids opened in the office of Gen. Poe, Detroit, a few days ago, were ten in number and ranged all the way from 87 cents per yard up to \$10 for boulders, and from 30 cents to 98 cents for other material.

Capt. James Davidson of West Bay City, C. B. Calder of the Detroit Dry Dock Company, C. F. Palmer of Buffalo, Capt. Alex. McDougall of West Superior, T. W. Sheriffs of Milwaukee and Capt. F. D. Herriman of the Bureau Veritas were all in Cleveland on business during the past few days. Capt. Herriman has gone to Everett, Wash., to inspect the steamers under construction in the ship yard of the American Steel Barge Company at that place.

Without ceremony and without even a trial run into the lake, the latest freight boat built by the Globe Iron Works Company has been named the Globe, and she will go to Lorain today (Thursday) for a cargo of coal consigned to Duluth. Although chartered for the balance of the season to the Northern Steamship Company, this boat is for sale. Her owners claim that she is the best freight ship on the lakes, and she is, certainly, a good boat. They find several prospective purchasers, but terms of payment are not satisfactory.

A Superior paper does not take kindly to the announcement that the American Steel Barge Company will endeavor to secure a return on the investment in its present fleet and build no more boats for some time to come. The Superior people seem to think that the barge company will build more boats this winter. Of course, there is no harm in hoping for a resumption of operations at the barge works, but there will be no new work begun as long as the Colgates, bankers of New York, hold for collateral as much of the barge company's stock as they now have on hand.

An insurance case now being heard in the United States district court, Cleveland, is attracting considerable attention. About a year ago the steamer V. Swain, owned by H. J. Johnson and others was badly damaged by fire. The owners considered the boat a total loss, and disagreements with the underwriters followed all attempts to hold a final survey. Damages demanded now include the loss resulting from the steamer lying idle during the present season. The Insurance Company of North America, represented by George L. McCurdy of Chicago, is the principal defendant. Expenses in the way of witness fees will be very heavy, as such men as James Davidson, Capt. F. D. Herriman and C. B. Calder, whose time is valuable, have been detained in Cleveland several days past giving expert testimony.

Trade Notes.

Baker & Co., assayers, Newark, N. J., with a New York office at No. 121 Liberty street, have issued a pamphlet containing a great deal of information about platinum.

Crawley & Johnston of Cincinnati, have closed a contract for equipping the steamer Imperial, now building at Howard's ship yard, Jeffersonville, Ind., for the Red River Line of New Orleans, with a "Cincinnati" steam steering gear.

The Art Amateur for August is a marine number and is of special interest to marine painters, professional and amateur. There are two separate plates of special merit—one in colors—showing a light-ship, and the other a crayon drawing, "Against the Tide." There is also an interesting article on an ocean studio. A copy of the August number can be had by sending 35 cents to Montague Marks, publisher, No. 23 Union Square, New York, N. Y.

McBean, Edge & Co., Buffalo, recently forwarded for the steamer Everett, a set of two mast head lights, and two side lights, to the American Steel Barge Company, Everett, Wash. These lights received the highest reward at the world's fair. Lamps of this company's manufacture are in use on a large number of lake steamers.

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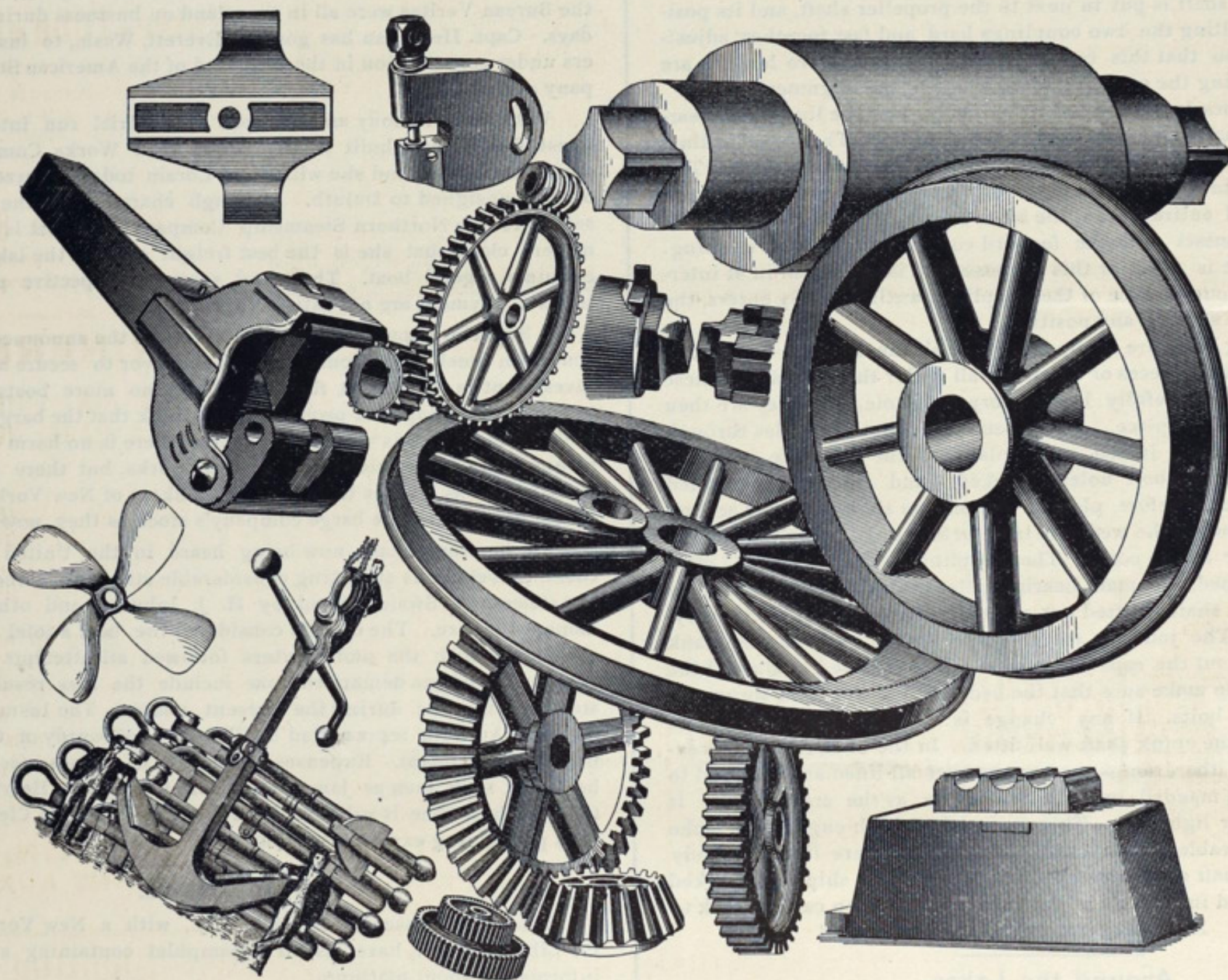
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Gears, &c.

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Stems,
Hawse
Pipes, Etc.

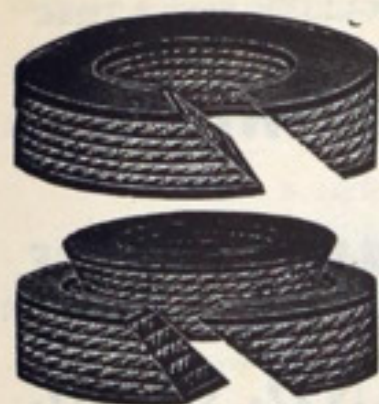
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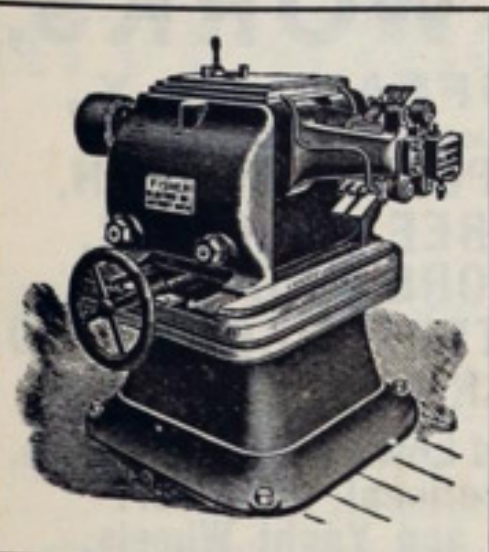
H. T. RASER,

Ashtabula, Ohio.

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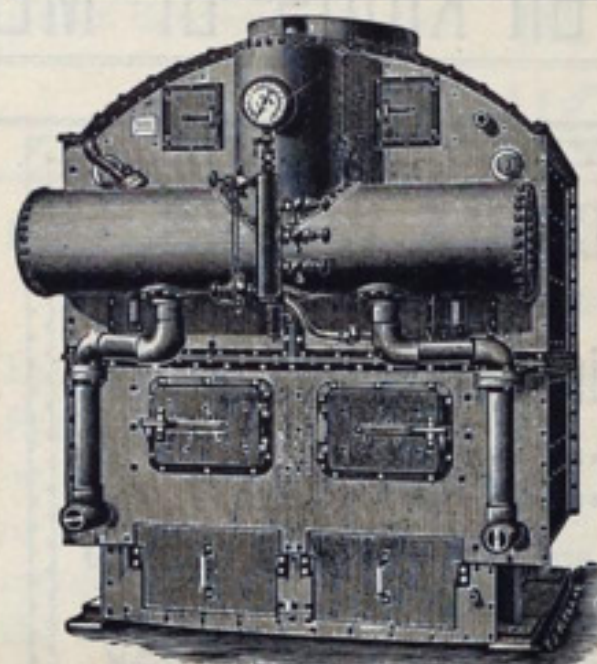
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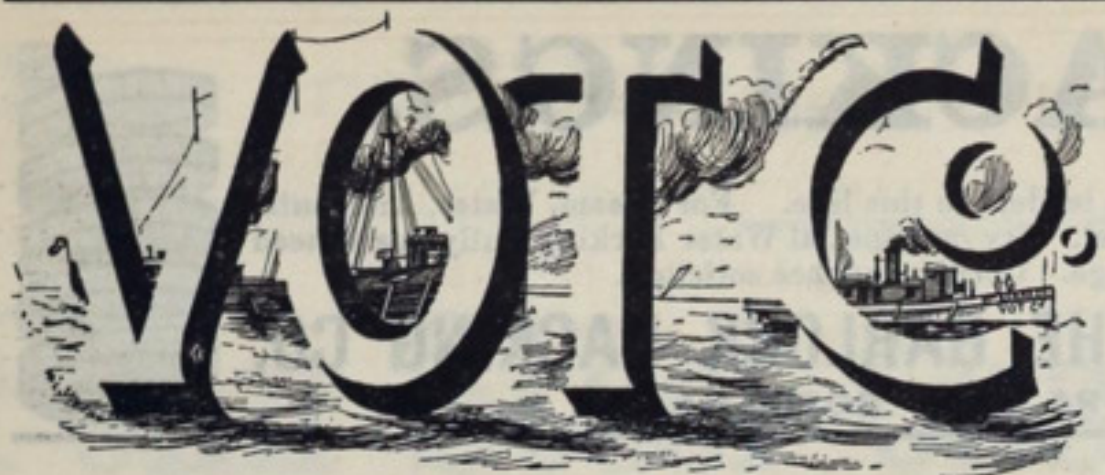
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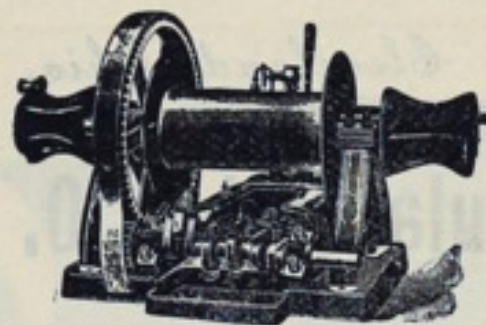
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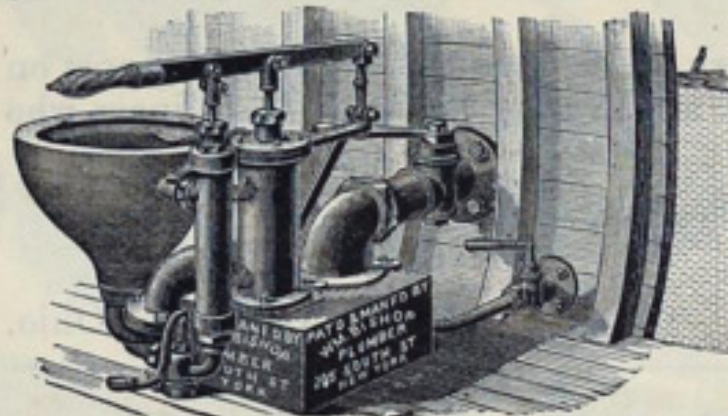
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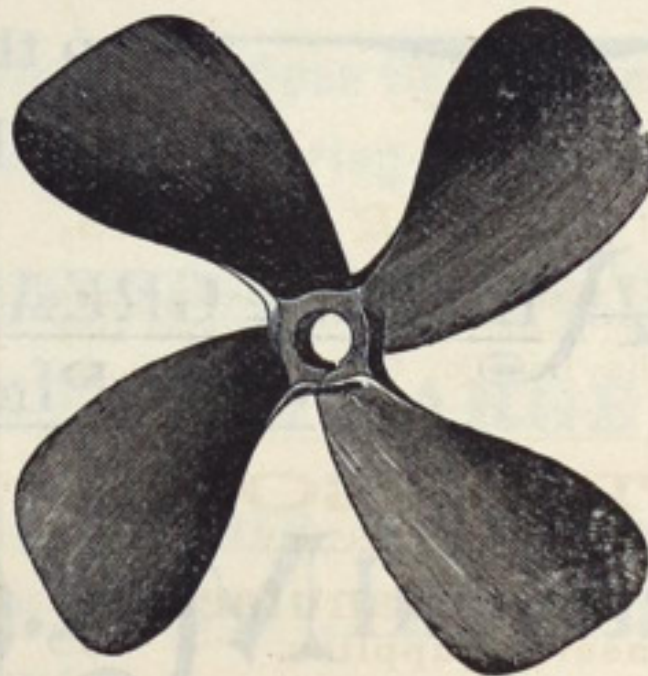
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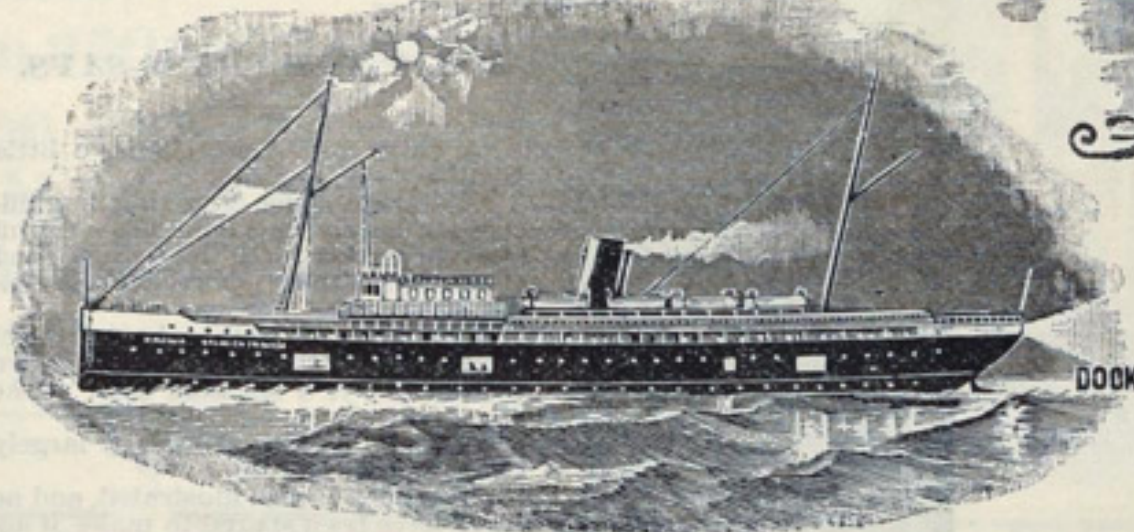
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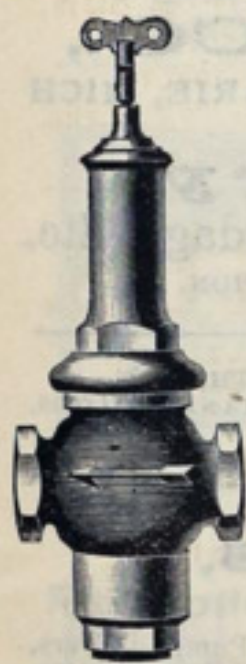


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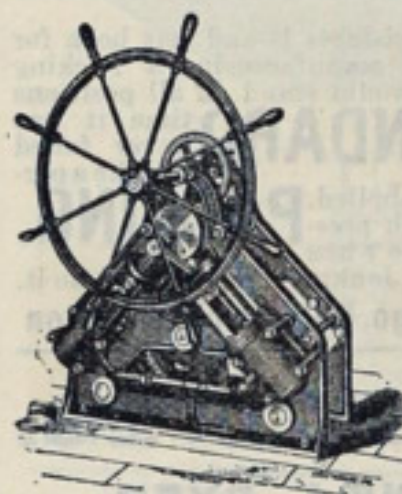
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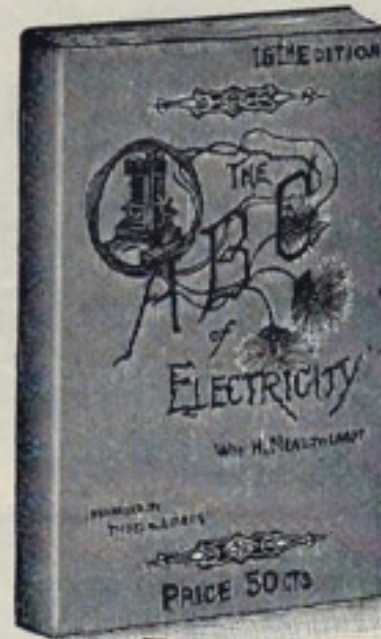
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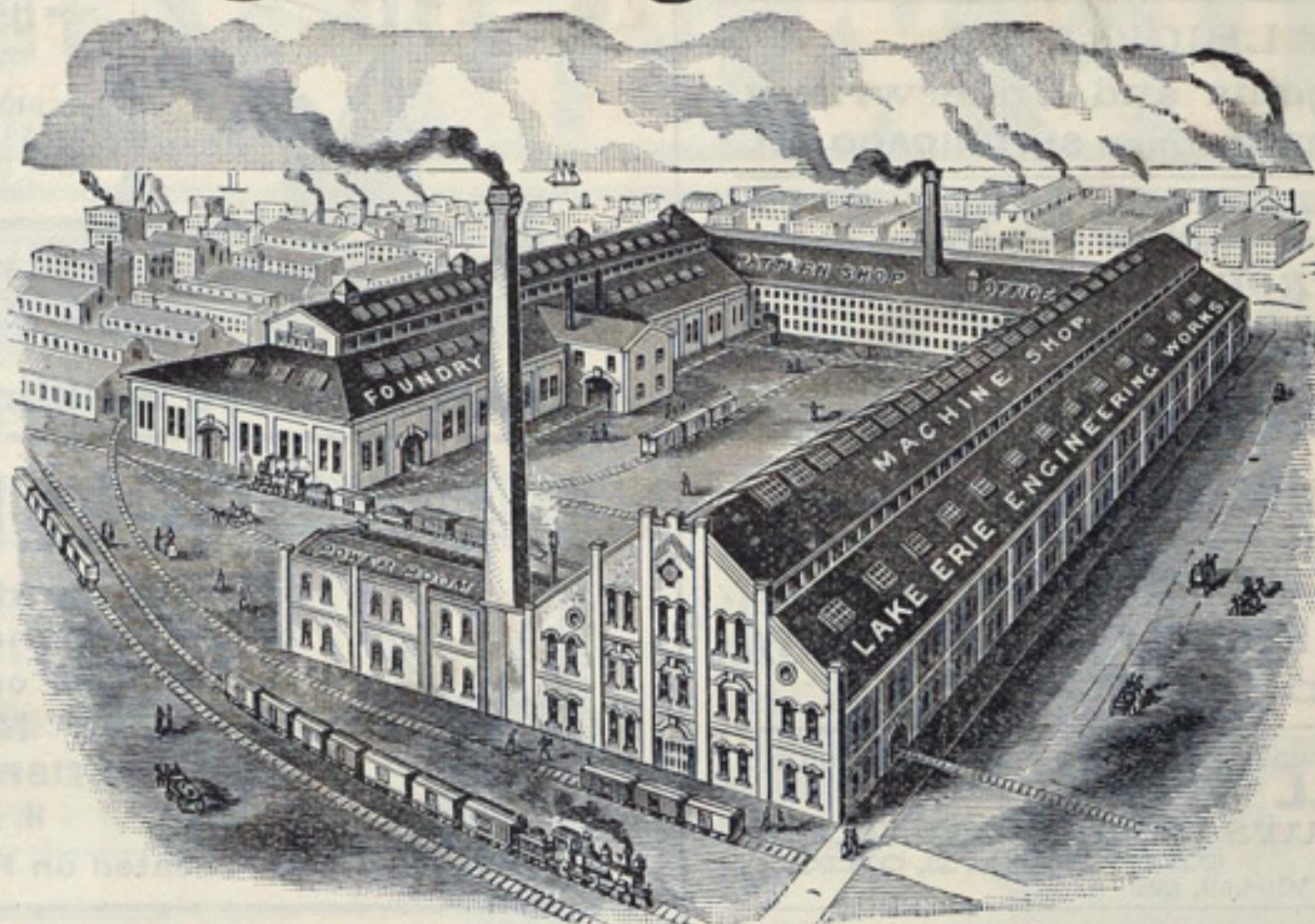
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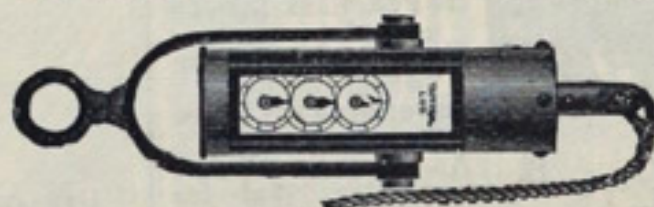
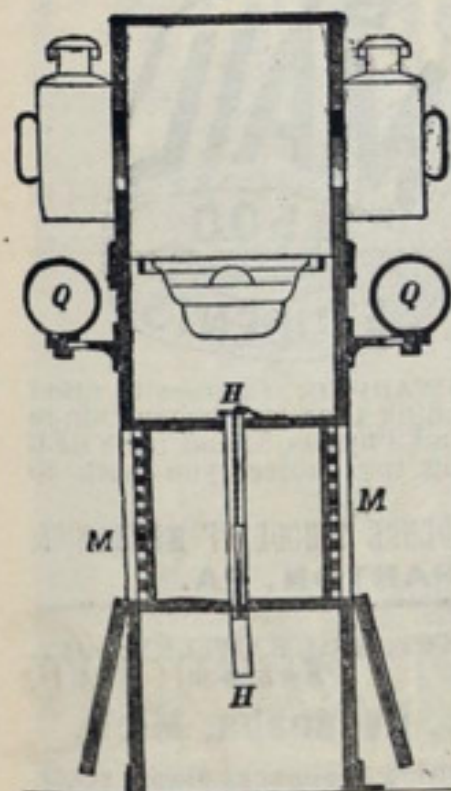
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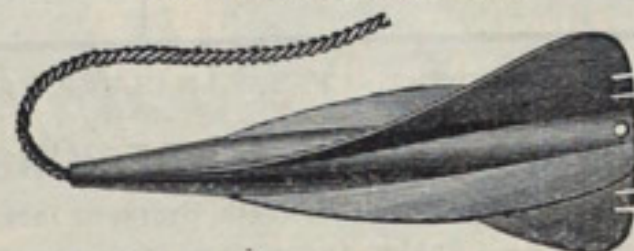
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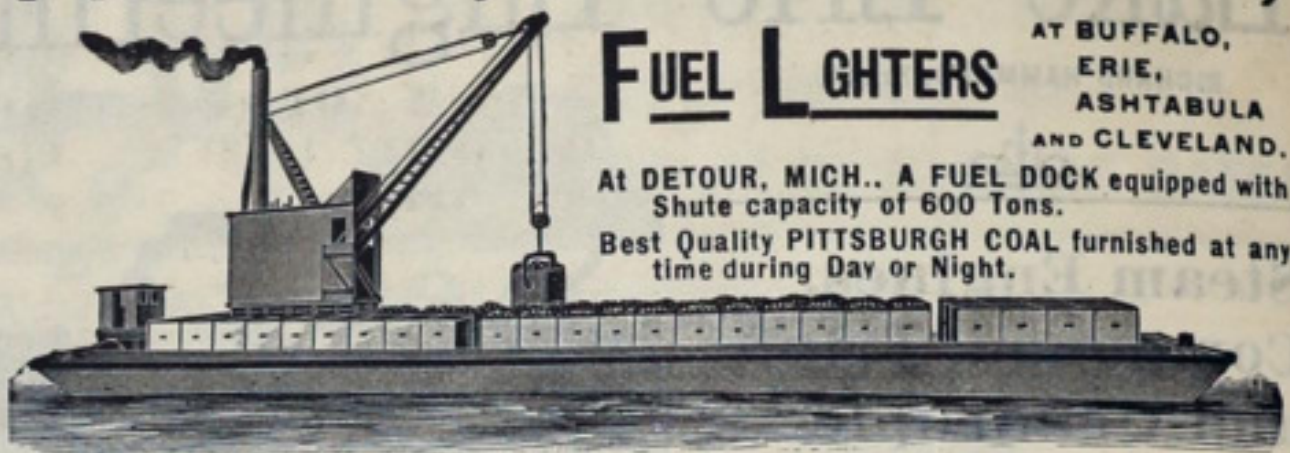
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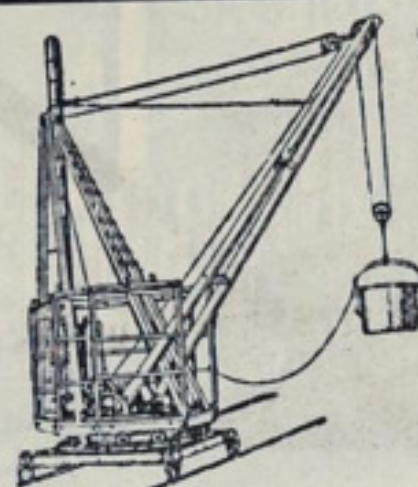
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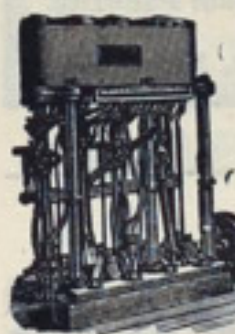
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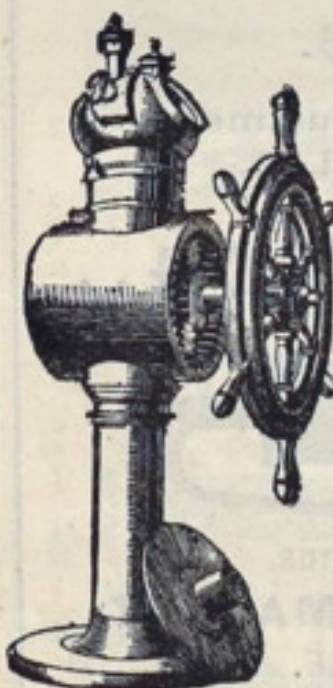
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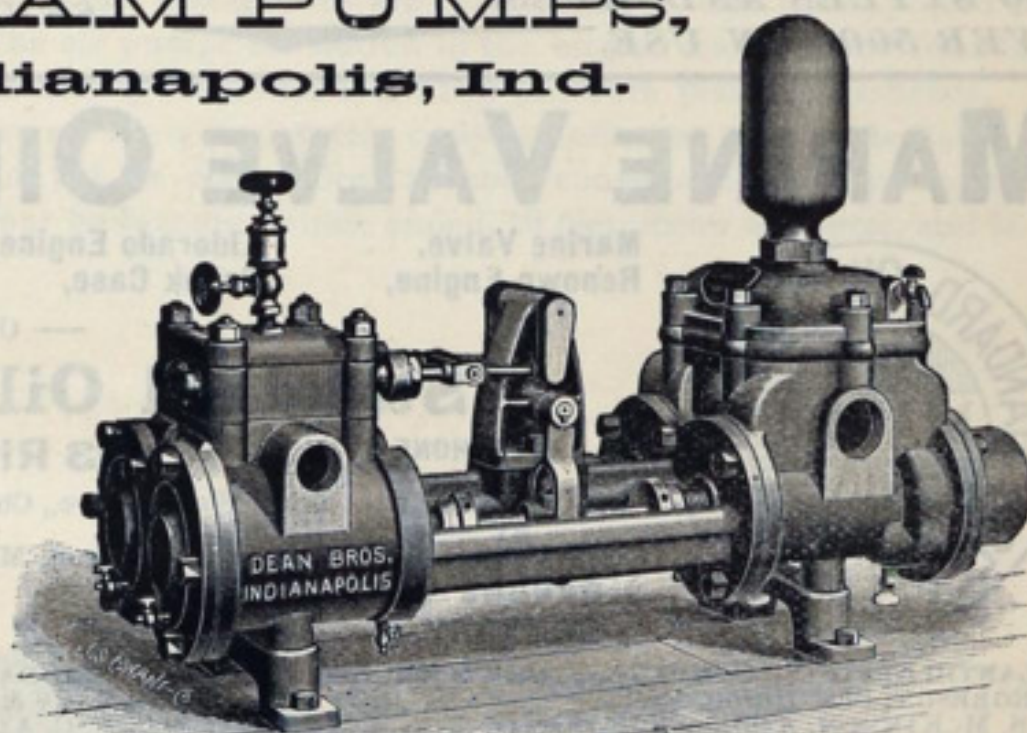
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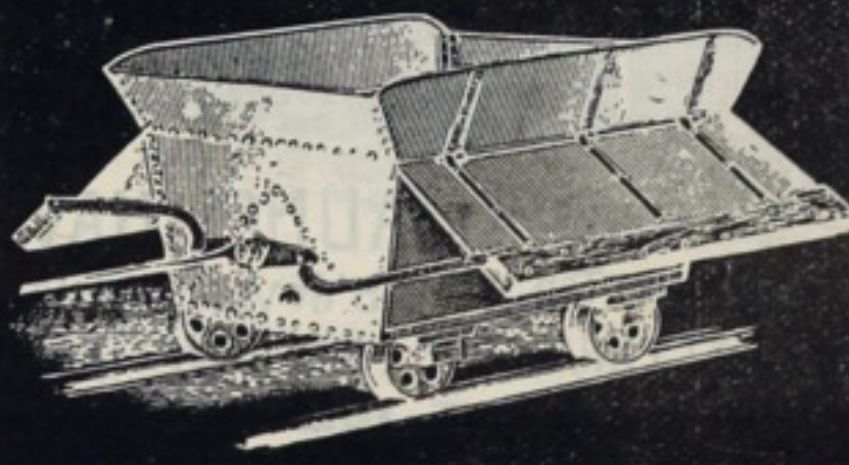
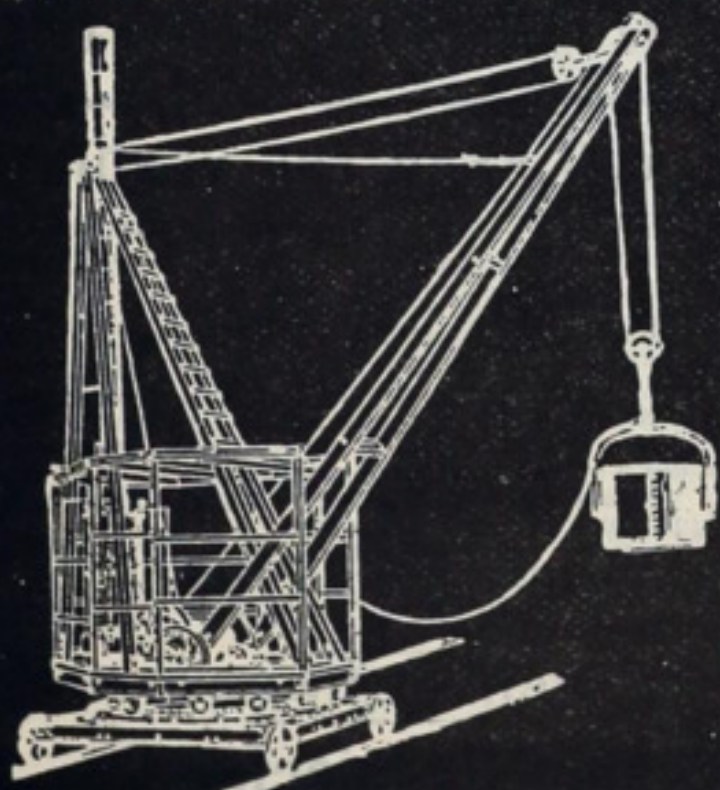
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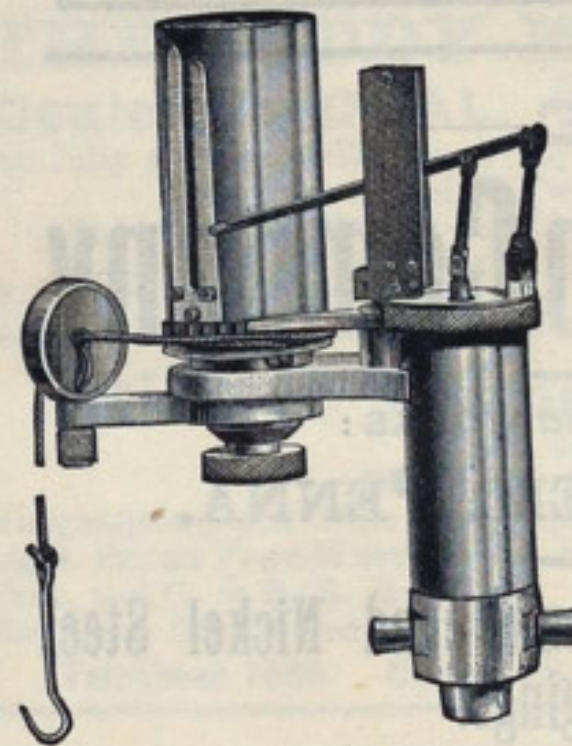
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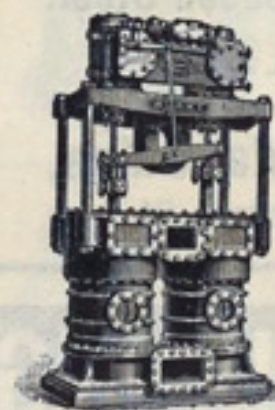
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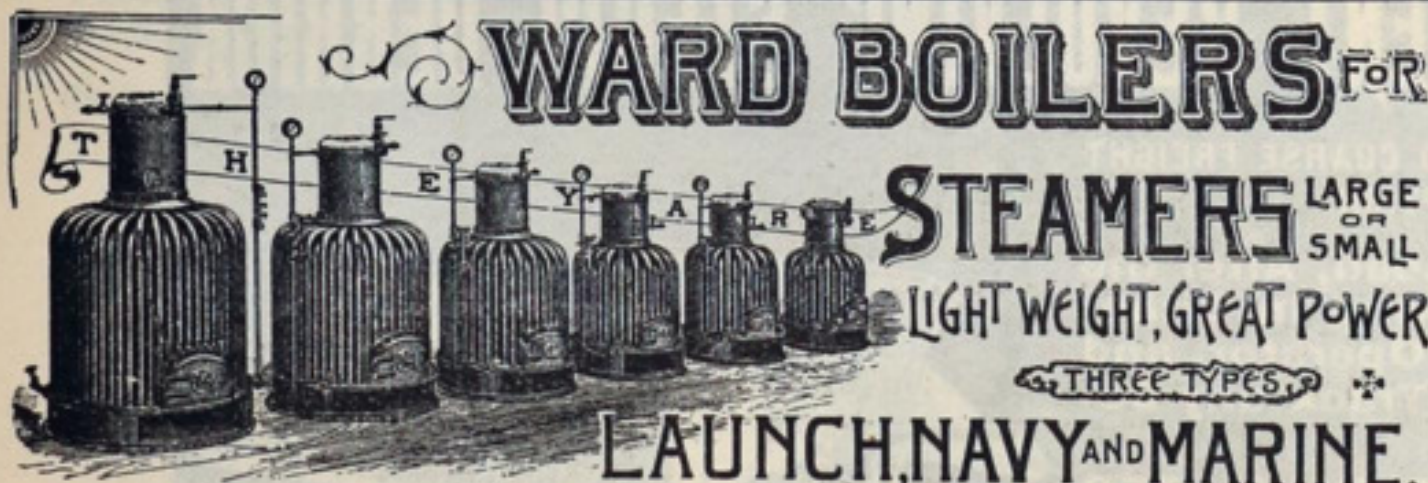
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